

is the month of greatest, and August of least velocity, the former exceeding the latter by 75 per cent. In some instances a storm-centre has remained stationary for twenty-four hours, and in four cases it travelled 1,200 miles in that time. In one case a speed of 57.5 miles per hour was reached. In April 1873 a storm-centre changed its path 360° in 24 hours. Taking into account the actual motion of a storm-centre from hour to hour, it seems that a storm-path may have every possible direction, and the velocity of progress may vary from 15 miles per hour westward to 60 miles per hour eastward.

The fall of rain seems to have a decided influence in modifying the course of a storm-path. The rainfall area is usually much larger to the east of a storm-centre than the west, 500 miles being the average length on the east side. There is a connection between the velocity of the storm's progress and the extent of this rain area—for example, when the eastern extent is 100 miles greater than the mean (500 miles), then the hourly velocity increased 14.9 miles beyond the mean (25.6), but when the eastern extent of the rain area is 100 miles less than the mean, the hourly velocity of the storm's progress is diminished 8.1 miles.

As to the direction in which the rain area is most extended, the axes of the areas were compared with the storm-paths, and gave this result, that the average course of a storm-path for twenty-four hours coincides very closely with the position of the axis of the rain area for the preceding eight hours.

Prof. Loomis says: "The progress of a storm eastward is not wholly due to a *drifting*, resulting from the influence of an upper current of the atmosphere from the west, but the storm works its own way eastward in consequence of the greater precipitation on the eastern side of the storm. Thus the barometer is continually falling on the east side of the storm and rising on the west side, in consequence of the flowing in of colder air on that side."

In order to trace the influence of the wind's velocity upon the progress of storms, Prof. Loomis divides a circle into four quadrants, and by an arrow in each, showing the average direction of the wind, it is at once perceived that there is a strong tendency of the winds inward to the centre of the storm; but the average direction in each quadrant differed from what it would be if the wind revolved in a circle round the storm-centre.

The velocity is greatest in the west quadrant and diminishes in the successive quadrants as we pass round the circle from west by south to north. On each side of the storm's centre the wind blows obliquely inward, and hence it is inferred that in the central region of the storm there is an upward motion of the air, and this is the cause of the precipitation of vapour; that is, the cause of the rainfall.

The average rise of a barometer for twenty-four hours in the rear of a storm is sensibly greatest when the velocity of progress is greatest. Prof. Loomis believes it is possible to predict where a storm-centre will be at the end of twenty-four hours.

His inquiries into the relation between the velocity of the wind and the velocity of a storm's progress have led to the conclusion that at a height of 6,000 ft. in the western quadrant of a storm the velocity of the wind is 68 per cent. greater than the velocity with which the storm advances.

He then considers how to determine whether a storm is increasing or diminishing in intensity, and concludes that when the barometer rises more rapidly than usual as the storm passes by, the pressure at the centre of the storm is increasing; but when in the rear of the storm the barometer rises less rapidly than usual, the pressure on the centre is diminishing or the storm is increasing in intensity. Sections on "The Form of Isobaric Curves," on "The Classification of Storms," and "Where do the Storms which seem to come from the far west originate?" conclude the article.

SCIENTIFIC SERIALS

The Geological Magazine, August.—This number contains five original articles. I. Notes on fossil Orthoptera related to *Gryllacris*, by A. H. Swinton. The fossil remains are two from the eocene and three from the coal formation. The two eocene are, *Gryllacris Ungerii* of Heer, and *G. Charpentieri* of Heer. The coal species are, *Gryllacris lithanthracis*, two species, and *Gryllacris [Corydalis] Brougniarti* (Aud.). In the specimen *G. Brougniarti* there are indications of the "file," on which Mr. Swinton remarks: "We see this ancient instrument of music had

already attained to all appearance an efficiency at least thrice that of our modern house cricket, and must have emitted notes that rang widely over the tropical forests that clothed our island in the old days of the coal period."—2. On the Source of Volcanic Heat, by Mr. G. Poulett-Scrope. Four-and-a-half pages are occupied in disavowing the views "saddled" upon him by Mr. Mallet, and in saying that Mr. Mallet's "definition" is a statement of a series of conjectures.—3. On the Glacial Epoch, by Mr. Croll. This is a continuation of the article commenced last month. The probable thickness of the Antarctic ice-cap was then considered, and now the results of the melting of a portion of it are calculated. The Antarctic ice-cap is equal in area to $1-23\frac{46}{100}$ of that covered by the ocean; therefore 25 ft. 6 in. melted off would raise the general level of the ocean one foot, and one mile melted would raise the level 200 ft. Mr. Croll takes for the time of his calculation the period when cold was increasing in the northern hemisphere and warmth in the southern. The lessening of ice-cap in the southern and an accumulation of ice in the northern would displace the centre of gravity of the earth leading to a rise in the sea-level in the northern hemisphere. This, with the rise resulting from the melting, Mr. Croll calculates would give for the latitude of Edinburgh a rise of sea-level of 800 to 1,000 ft. The supposition of the subsidence of land during our glacial period may therefore, he argues, be dispensed with; and he proceeds to show how this theory avoids many difficulties which the elevation and subsidence theory leads to. Further: the oscillations of sea level resulting from the displacement of the earth's centre of gravity throw light on many obscure points connected with the geographical distribution of animals and plants. For example, during the warm periods the English Channel would be dry land, and during the cold animals might cross to England from the north upon a frozen sea. And still further: if we knew (1) the extent of the general submergence of the glacial epoch and (2) the present amount of ice in the southern hemisphere, we could determine whether or not the earth is fluid in the interior.—4. Geological notes from the neighbourhood of Cairo, by John Milne. The article, which is too long for us to notice, is illustrated by a section and sketch maps.—5. The Red Chalk in Yorkshire, by the Rev. J. F. Blake. The paper principally refers to the occurrence of *Ammonites Deshayesi* in the red chalk, in the pebble-beds below it, at Hunstanton, in the Sprocton clay, and in the gault of Folkestone. The chalk is a deep-sea deposit, and in the sinking of the land in Upper Cretaceous times the passage beds from the Upper Neocomian to the Aptien were laid down in various areas from various sources. *A. Deshayesi* evidently lingered on during the time these changes were taking place till the red chalk set in in Yorkshire and the gault at Folkestone.—Among the reports is a notice of the Cotswold Club visit to Bath and a *résumé* of a paper, read by Dr. Wright, On the genesis of the oolites.

Proceedings of the Liverpool Naturalists' Field Club, 1873-74.—This club, which is fourteen years old, we are glad to see continues in a flourishing condition as regards members and funds, and has, during the session 1873-74, been doing a fair amount of work. The present number of the Proceedings contains the address of the president, the Rev. H. H. Higgins, at the annual meeting, in which he touches on a variety of topics more or less connected with Natural History; following this is a list, prepared by Mr. Higgins, of all works bearing on the Natural History of the district of Liverpool from 1705 to the present time. The club made ten excursions during the summer and autumn of 1873, and an account of these, with the detailed results of some of them, occupies part of the number. Appended is a list of excursion prizes to be competed for this summer, and the names of last years' winners.

Proceedings of the Winchester and Hampshire Scientific and Literary Society, vol. 1, part iii. (1872-3).—We learn from the Fourth Annual Report of the society that as a consequence of altering the rules so as to admit ladies, several ladies have become members. We are glad to see also that sections have been formed for the special study of botany, entomology, and zoology, and that work has already been done in each of these departments. During 1873, eighteen papers have been read in the society, most of them on subjects connected with science. In an introductory lecture, the Rev. E. Firmstone gives an interesting *résumé* of what is known about the "Star Depths." Among the other papers we would note an ingenious one On the probable origin of flints, by Mr. A. Angell, jun.; "The Heraldy of the World," a long paper, amply illustrated, by Miss Zornlin;

On some of the parasitic fungi common in the neighbourhood, by Mr. F. J. Warner, F.L.S.; Notes on new or rare Hampshire insects, by the Rev. W. Spicer; and an interesting paper on Lapland.

THE *Geographical Magazine*, August.—This number opens with an interesting account, illustrated by a map, of the Cameron African Expedition up to the beginning of the present year. In "The Lufji River and the Copal Trade," some account is given of recent explorations of the delta of this little-known African river. Capt. Davis continues his notes on the voyage of the *Challenger*, Mr. G. Turner his "Impressions of Jamaica," and Mr. H. P. Malet his "Sign-posts on Ocean's Highway," in which he brings together various theories on the formation of mountains. "Djetysahr (Eastern Turkestan), its Sovereign and its Surroundings," is the title of a paper, with a map, by Mr. R. Michell. In an article on "The Archaeological Survey of India," an account is given of some important discoveries recently made among the Buddhist remains of Bharabut, in the Central Provinces. The number also contains a very interesting account of a recent visit to the Caroline Islands.

Bulletin de la Société d'Anthropologie de Paris, t. viii.—The diminution in the population of France which had taken place between the census of 1866 and that of 1872, and is far in excess of what may be referred to losses in battle and the annexation by Germany of the Alsace-Lorraine territory, has been made the subject of a series of papers by M. Bertillon. The whole subject of the decrease of the population in France is one that is necessarily engaging the attention of medical as well as statistical writers. In the discussion which M. Bertillon's paper raised at the ordinary meeting of the Society, M. Lagneau drew attention to the results given in a paper read by himself before the Académie de Médecine On the census of 1872 and the condition of the population of France, in which he has attempted to show that the small number of births when compared with the deaths is to be referred, not to any special ethnogenic or climatic relations, but rather to the influence of certain laws of succession and subdivision of property, and to the agency of military enactments, the one inducing late marriages and the other enforcing celibacy on a large proportion of men in the prime of life.—A valuable Report has been drawn up under the direction of the Commissioners for Algeria, by M. le Général Faidherbe and others, on the anthropology of that province, and has been formally presented to the Anthropological Society of Paris. After a general preliminary dissertation by M. Faidherbe on the different races which have occupied or still occupy the Algerine territory, Dr. Topinard considers at great length the ethnological, social, moral, linguistic and other relations of the Arabs and Berbers, who constitute the main branches of the French tributary tribes.—M. Roujou attempts in a lecture, which he delivered before the Society in the course of last year, to prove that a fair-haired race occupied the Gallic soil before the advent of the Germanic tribes, including Gauls under that denomination. He is of opinion that the ancestors of the Hellenes, the constructors of those megalithic remains which extend from the Atlantic to the Indian Ocean and from Scandinavia to Africa, and the fair-haired invaders of Egypt, who sixteen or seventeen centuries before our era had reached the Nile from the north-west, all belonged to one ancient blonde race, which long before the appearance of Teutons and Gauls had occupied Western Asia, Northern Africa, and the lands of Europe as the dominant or aristocratic class. M. Roujou discusses the much-vexed question whether the primitive Celtic races were fair or dark, dolichocephalic or brachycephalic, the former opinion being maintained by Dr. Pruner Bey, while the latter view is supported by all the learning that the great anthropologist, Dr. Broca, can advance in its favour.

Annali di Chimica applicata alla medicina, vol. lviii. No. 6, June.—This part concludes the eighteenth volume and contains the following papers:—In pharmacy, G. Righini furnishes a contribution on the iodides of sodium and ammonium and the production of iodoform in a mixture of these salts.—Dr. Coutinho furnishes a paper on the use of *Jaborandi*, a tree growing in North Brazil.—There is also a paper in this section on Anglo-Saxon condensed milk, reprinted from *Le Mouvement Médical* for March.—In hygiene, there is a paper by Pietro Carpani On a simple method for determining the quantity of lead contained in pewter vessels.—Action of water on lead, by Fordos.—In dietetics, Dr. F. Turbacco furnishes the concluding part of his paper On cheese and its alimentary use.—In physiology, Dr. G.

Cappelli has a communication On the anti-fermentative action of boric acid and its efficacy in certain diseases.—Studies relating to the question of heterogenesis, by Prof. G. Cantoni.—Under the heading "Varieties" there is a paper by Gioachino Curti On the substitution of the earth of the *solfatara* of Pozzuoli for sulphur in the sulphurisation of vines.

Gazzetta Chimica Italiana, fascicolo iv.—This number commences with a paper by Prof. E. Pollacci On the mode of action of sulphur on calcium carbonate. Dr. Giuseppe Bellucci furnishes also a contribution on the same subject.—Chemical analysis of a marine plant (*Posidonia oceanica*, Koen) used in Liguria as manure, by Fausto Sestini.—Hugo Schiff contributes a paper On some derivatives of phloretine. The author describes in detail the method of preparing this substance, also the preparation of phloroglucine, phloretic acid, phloroglucide and triphloretide.—A. Pavesi and E. Rotondi give an account of the work done in the chemical laboratory of the Agricultural College of Milan. This comprises papers On rice oil; On the analysis of volcanic ashes which fell at Naples; the solubility of calcium phosphate in sulphurous acid; On parabussine, a new alkaloid contained in *Buxus sempervirens* (the sulphate has the formula $C_{26}H_{48}N_2O_8S_4$); On a practical method of determining the degree of acidity of milk; and, finally, On the quantitative determination of tannin especially in the must of grapes and in wine, modification of Flek's method.—The following papers are communicated from the station at Asti:—On the chalkiness of must, by Dr. I. Macagno.—Influence of light on vegetation, by the same author.—Experiments on the process of fermentation, by the same author.—The remainder of this part consists of a summary of foreign journals.

SOCIETIES AND ACADEMIES

LONDON

Royal Horticultural Society, August 5.—W. A. Lindsay in the chair.—The Rev. M. J. Berkeley called attention to *Fuchsia procumbens*, an interesting species—probably nearly hardy and suitable for rockwork—from New Zealand; *Pavla macrostachya* and *Clethra arborescens* were sent from the gardens of Syon House.—Mr. H. B. Hennel exhibited a large plant of *Lilium auratum* with two stems—one fasciated, bearing forty-eight, and the other seventeen flowers.

PHILADELPHIA

Academy of Natural Sciences, Feb. 3.—Dr. Ruschenberger, president, in the chair.—Dr. Chapman exhibited a dissection of one of the hind legs of a musk-rat, *Fiber zibethicus*. The tendons of the tibialis anticus, extensor proprius hallucis, and extensor longus digitorum, pass down a groove in the tibia and under a little process of bone. The extensor longus digitorum is held down by an additional process. This arrangement seems to quicken the extension of the foot, and is of use apparently to the animal in swimming.—Prof. Leidy remarked that while it was exceptional to find the same species of the higher sub-kingdoms in the different parts of the world, it appeared to be the rule that most species of *Protozoa* were found everywhere under the same conditions. A large number of our fresh-water forms he had recognised as the same as those described by European authors. A less number of species are probably peculiar to every region. Among our fresh-water *Rhizopods* he had observed not only the genera *Amoeba*, *Arcella*, *Diffugia*, *Euglypha*, *Trinema*, *Lagymis*, *Actinophrys*, &c., but also most of the species of these as indicated by European naturalists. It is an interesting question whether our fresh-water *Protozoa* have reached us from the same sources as those of Europe and other remote countries. If derived from the same sources they were probably infused in the waters of the different continents at an early age when the latter were not separated by ocean barriers. If thus early infused we have a remarkable instance of a multitude of specific forms retaining their identity through a long period of time. Such a view might appear to oppose the doctrine of evolution, but not justly so, for the simplest forms would be the slowest or least likely to vary, while the most complex, from their extended relationships, would be most liable to variation. Perhaps, however, the simplest forms of life, of the same species, may have originated independently of one another, not only in different places, but also at different times, and may yet continue to do so. While the highest forms of life may have been slowly evolved from the